

REMARKS

The Office Action mailed August 16, 2004, has been received and reviewed. Claims 1 through 43 are currently pending in the application. Claims 1 through 10, 13 through 23, and 25 through 43 stand rejected. Claims 11, 12 and 24 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation. Applicants have amended claims 1-43, and respectfully request reconsideration of the application as amended herein.

The amendments effectuated to each of claims 1-43 include replacement of the word “said” with “the,” an equivalent term, for enhanced readability. Other amendments, for example, in claims 4, 5, 17, 29, 39 and 43, have been made to enhance antecedent basis. Further amendments, such as those made to claims 20 through 30, 35 and 43 involving the recitation of the claimed invention in independent claims as a “computer readable medium having computer executable instructions which when executed on a computer perform a process for tracking a movement of a particle through a geometric model. . .” have been implemented to address the rejection under 35 U.S. § 101 and to provide proper antecedent basis in dependent claims to accommodate these amendments. Further amendments involve removal of the recitation of “steps” in the claims, as the claimed methods and processes comprise acts, not steps. Accordingly, none of the amendments surrenders any scope of a claim as originally filed and, in some instances, is believed to broaden claims scope. Thus, the claims in their presently amended form are entitled at least to the scope of the originally filed herein, as well as equivalents.

37 C.F.R. § 1.75(d)(1) Claim Objections

Claims 1 and 34 are objected to because of informalities. Claims 1 and 34 have been amended herein as suggested by the Examiner, and the Examiner’s kind suggestions are acknowledged with appreciation. No reduction in claim scope has been effectuated by the amendments

Double Patenting Rejection Based on U.S. Patent No. 6,175,761

Claim 1 stands rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 8 of U.S. Patent No. 6,175,761.

Claims 2 through 7 and 9 through 12 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2 through 7 and 9 through 12 of U.S. Patent No. 6,175,761.

Claim 20 stands rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 20 and 8 of U.S. Patent No. 6,175,761.

Claims 21 through 28 stand rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 21 through 28 of U.S. Patent No. 6,175,761.

In order to avoid further expenses and time delay, Applicants elect to expedite the prosecution of the present application by filing a terminal disclaimer to obviate the double patenting rejections of claims 1-7, 9-12, and 20-28 in compliance with 37 CFR §1.321 (b) and (c). Applicants' filing of the terminal disclaimer should not be construed as acquiescence of the Examiner's double patenting or obviousness-type double patenting rejections. Attached is the terminal disclaimer and accompanying fee.

35 U.S.C. § 101 Non-Statutory Subject Matter Rejection

Claims 20 through 30, 35 and 43 stand rejected under 35 U.S.C. § 101 because the claimed inventions are directed to non-statutory subject matter.

Regarding claims 20, 29, 35 and 43, these claims have been amended to indicate that the computer executable instructions of the computer readable medium perform a process when executed on a computer. With these amendments, these claims are no longer directed toward non-statutory subject matter. Therefore, Applicants request that the 35 U.S.C. § 101 rejection of claims 20, 29, 35, and 43 be withdrawn.

Regarding claims 21-28, with the amendment to claim 20, claim 20 is no longer directed toward non-statutory subject matter. As a result, claims 21-28, which depend from claim 20, are no longer directed toward non-statutory subject matter. Therefore, Applicants request that the 35 U.S.C. § 101 rejection of claims 21-28 be withdrawn.

Regarding claim 30, claim 30 has been amended to indicate that the computer executable modules include computer executable instruction and the computer executable instructions perform a process when executed on a computer. Therefore, Applicants request that the 35 U.S.C. § 101 rejection of claim 30 be withdrawn.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al.

Claims 1 and 9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475). Applicants respectfully traverse this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on

applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Regarding claim 1, the Office Action states that the Kaufman et al. reference teaches "arranging a plurality of substantially uniform volume elements into the geometric model; and **traversing the particle along the particle track** from one uniform volume element to another uniform volume element in **integer base increments** (Fig. 2; Fig. 3; CL1, L66 to CL2, L11; CL2, L34-57)." While the Kaufman et al. reference, may disclose arranging the plurality of substantially uniform volume elements as voxels, Applicants can find no reference to traversing the particle along the particle track. In addition, neither the Silver reference, nor the Kaufman et al. reference disclose traversing from one uniform volume element to another volume element in **integer based increments**. Applicants can find no disclosure of integer base increments in either of the references. However, the integer based increments are significant to the present invention in that they reduce required computing power as described at page 25, lines 6-17.

"Since, the array was mapped using integers, the anatomical material of the starting univel is easily determined by rounding each of the coordinates (x1, y1, z1) down to the nearest integer. As such, for (3.5, 1.5, 5.6) the starting material of that univel is found in the array at (3,1,5) as illustrated in table 210 (Figure 7).

Perhaps not readily apparent, the advantage of this is found as a result of the way computing system configurations perform calculations. For example, although a computer could determine the anatomical material of the univel from the coordinates (3.5, 1.5, 5.6) it is easier and much faster for a computer if floating point mathematics is not involved when computing and storing. Thus, by determining the anatomical material of the univels with integers, valuable computational time is preserved for other calculations and clinical uses."

As a result, the prior art references of Silver and Kaufman et al., individually or combined, do not teach or suggest all the claim limitations of claim 1. Specifically, the limitation of traversing

the volume elements **in integer based increments** is not taught or suggested. Therefore, the 35 U.S.C. § 103(a) rejection of claim 1 is not proper and Applicants respectfully request the rejection of claim 1 be withdrawn.

Regarding claim 9, claim 9 depends from independent claim 1, which is now allowable. As a result, claim 9 is now allowable and Applicants respectfully request that the rejection of claim 9 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,083,167 to Fox et al.

Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 2, claim 2 depends from independent claim 1, which is now allowable. As a result, claim 2 is now allowable and Applicants respectfully request that the rejection of claim 2 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,589,502 to Coniglione et al.

Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Coniglione et al. (U.S. Patent No. 6,589,502). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 3, the Office Action states that the Coniglione et al. reference “teaches the step of defining a material to be associated with the treatment volume (CL1, L7-9; CL 4, L39-44), because the selected material would determine the desired amount of radiation emitted by the material.” Applicants respectfully suggest that this is not what claim 3 recites. Claim 3 recites “defining a material to be associated with **each said uniform volume element.**” (emphasis added) It appears that the Examiner is considering the entire volume of the geometric model and identifying a “material” (i.e., “radioactive composite” in the Coniglione et al. reference) used to treat the region associated with the geometric model. Whereas claim 3 recites associating a material of the patient at **each uniform volume element.** This is supported by the specification at page 19, lines 4-8, by stating that; “[i]nherent with a pixel of information in a medical image is an anatomical material, such as bone, soft tissue, blood, etc or the radiation source itself administered at step 102. Such materials are broad ranging and are often identified with bytes of information. Whatever the anatomical material, each univel is associated with a material and is mapped to an array.” In other words, a different material (including anatomical material) may be assigned to each uniform volume element, rather than a “radioactive composite” assigned to the entire volume of the geometric model as disclosed in the Coniglione et al. reference and suggested by the Examiner.

As a result, the prior art references of Silver, Kaufman et al., and Coniglione et al., individually or combined, do not teach or suggest all the claim limitations of claim 3. Specifically, the limitation of defining a material to be associated with **each said uniform volume element** is not taught or suggested. Therefore, the 35 U.S.C. § 103(a) rejection of claim 3 is not proper and Applicants respectfully request the rejection of claim 3 be withdrawn.

Regarding claim 4, claim 4 depends from claim 3, which is now allowable. As a result, claim 4 is now allowable and Applicants respectfully request that the rejection of claim 4 be withdraw.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,589,502 to Coniglione et al. and U.S. Patent No. 5,821,541 to Tumer

Claims 5, 13 through 16, 20 through 23 and 28 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Coniglione et al. (U.S. Patent No. 6,589,502) and Tumer (U.S. Patent No. 5,821,541). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 5, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest the “material” to be determined for the “one” and the “another” uniform volume elements, as suggested by the Examiner. As a result, the prior art references of Silver, Kaufman et al., Coniglione et al., and Tumer, individually or combined, do not teach or suggest all the claim limitations of claim 5. Therefore, the 35 U.S.C. § 103(a) rejection of claim 5 is not proper and Applicants respectfully request the rejection of claim 5 be withdrawn.

Regarding claim 13, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest the “**material**” to be associated with **each uniform volume element**, as suggested by the Examiner.

In addition, Applicants assert that the Tumer reference does not teach or suggest the element of “describing a particle track with a **primary direction** of movement through said geometric model.” The Tumer reference appears to discuss directions of gamma rays and recoil electrons, but, these directions appear to be vectors that can point in any direction within a given coordinate system, such as, for example, a Cartesian coordinate system. However, the present invention includes a specific meaning for “primary direction” which is different from the directions

disclosed in the Tumer reference. In particular, the present invention defines a primary direction as a vector parallel with the X, Y, or Z axis of a Cartesian coordinate system represented by the coordinates of the univels. This is evidenced by page 24, lines 2-10 of the specification describing primary, secondary, and tertiary directions of movement.

“To further illustrate this, in Figure 7, an exemplary particle track is depicted in three dimensions of a Cartesian coordinate system as particle track 200. The particle track 200 is depicted in two dimensions, in the X-Y plane, as particle track 202. From this illustration, it is seen that the track **advances in the greatest intervals** in the positive Y direction of travel. **Thus, the primary direction of movement is in the positive Y direction** and the initial conditions will be established in accordance with this positive Y direction. Whatever other directions of movement remain, here the X and Z directions, are termed the secondary and tertiary directions of movement, or vice versa depending upon how classified.”

For the reasons stated above, the prior art references of Silver, Kaufman et al., Coniglione et al., and Tumer, individually or combined, do not teach or suggest all the claim limitations of claim 13. Therefore, the 35 U.S.C. § 103(a) rejection of claim 13 is not proper and Applicants respectfully request the rejection of claim 13 be withdrawn.

Regarding claims 14 and 15, these claims depend from claim 13, which is now allowable. As a result, claims 14 and 15 are now allowable and Applicants respectfully request that the rejection of claims 14 and 15 be withdrawn.

Regarding claim 16, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “stepping along the particle track in **integer based increments** of the coordinate system,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the element of “stepping along the particle track . . . along the **primary direction** of movement,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Coniglione et al., and Tumer, individually or combined, do not teach or suggest all the claim limitations of claim 16. Therefore, the 35 U.S.C. § 103(a) rejection of claim 16 is not proper and Applicants respectfully request the rejection of claim 16 be withdrawn.

Regarding claim 20, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “traversing said particle along said particle track in **integer based increments**,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest “mapping a material associated with **each said uniform volume element** to an array,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Coniglione et al., and Tumer, individually or combined, do not teach or suggest all the claim limitations of claim 20. Therefore, the 35 U.S.C. § 103(a) rejection of claim 20 is not proper and Applicants respectfully request the rejection of claim 20 be withdrawn.

Regarding claims 21-23 and 28, these claims depend from claim 20, which is now allowable. As a result, claims 21-23 and 28 are now allowable and Applicants respectfully request that the rejection of claims 21-23 and 28 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer and U.S. Patent No. 5,493,595 to Schoolman

Claims 6 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541) and Schooman (U.S. Patent No. 5,493,595). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claims 6 and 7, these claims depend from claim 1, which is now allowable. As a result, claims 6 and 7 are now allowable and Applicants respectfully request that the rejection of claims 6 and 7 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 5,821,541 to Tumer

Claims 8 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Tumer (U.S. Patent No. 5,821,541). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 8, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the element of “stepping along the particle track . . . along the **primary direction** of movement,” as suggested by the Examiner.

For this reason, the prior art references of Silver, Kaufman et al., and Tumer, individually or combined, do not teach or suggest all the claim limitations of claim 8. Therefore, the 35 U.S.C.

§ 103(a) rejection of claim 8 is not proper and Applicants respectfully request the rejection of claim 8 be withdrawn.

Regarding claim 10, this claim depends from claim 1, which is now allowable. As a result, claim 10 is now allowable and Applicants respectfully request that the rejection of claim 10 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer and U.S. Patent No. 5,498,876 to Moscovitch

Claims 17, 19 and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541) and Moscovitch (U.S. Patent No. 5,498,876). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 17, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “simulating a particle movement along each said particle track through said geometric model in **integer based increments** along said primary direction of movement,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the element of “simulating a particle movement along each said particle track through said geometric model in integer based increments along said **primary direction** of movement,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest “defining a material to be associated with **each said uniform volume element**,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Fox et al., Coniglione et al., Tumer, and Moscovitch, individually or combined, do not teach or suggest all the claim limitations of claim 17. Therefore, the 35 U.S.C. § 103(a) rejection of claim 17 is not proper and Applicants respectfully request the rejection of claim 17 be withdrawn.

Regarding claim 19, this claim depends from claim 17, which is now allowable. As a result, claim 19 is now allowable and Applicants respectfully request that the rejection of claim 19 be withdrawn.

Regarding claim 29, as stated by the Examiner, this claim is a computer readable medium claim reciting the same limitations as those of claim 17. Consequently, the same arguments regarding claim 17 are applicable to claim 29. Because claim 17 is now allowable, claim 29 is also now allowable and Applicants respectfully request that the rejection of claim 29 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer, U.S. Patent No. 5,498,876 to Moscovitch and U.S. Patent No. 5,493,595 to Schoolman

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541), Moscovitch (U.S. Patent No. 5,498,876) and Schoolman (U.S. Patent 5,493,595). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 18, this claim depends from claim 17, which is now allowable. As a result, claim 18 is now allowable and Applicants respectfully request that the rejection of claim 18 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al. and U.S. Patent No. 5,821,541 to Tumer

Claims 25 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502) and Tumer (U.S. Patent No. 5,821,541). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claims 25 and 26, these claims depend from claim 20, which is now allowable. As a result, claims 25 and 26 are now allowable and Applicants respectfully request that the rejection of claims 25 and 26 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer, and U.S. Patent No. 5,493,595 to Schoolman

Claim 27 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502), Tumer

(U.S. Patent No. 5,821,541), and Schoolman (U.S. Patent 5,493,595). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 27, this claim depends from claim 20, which is now allowable. As a result, claim 27 is now allowable and Applicants respectfully request that the rejection of claim 27 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al., and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al. and U.S. Patent No. 6,345,114 to Mackie et al.

Claim 30 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502) and Mackie et al. (U.S. Patent No. 6,345,114). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 30, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “a projection module for tracking a movement of a particle through said geometric representation according to **integer based steps**,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest “a storage module for storing a material for **each said uniform volume elements**,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Fox et al., Coniglione et al., and Mackie et. al., individually or combined, do not teach or suggest all the claim limitations of claim 30. Therefore, the 35 U.S.C. § 103(a) rejection of claim 30 is not proper and Applicants respectfully request the rejection of claim 30 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al., and further in view of U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer and U.S. Patent No. 5,498,876 to Moscovitch

Claims 31 through 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541) and Moscovitch (U.S. Patent No. 5,498,876). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 31, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “describing a movement having a primary direction thereof of a particle through said geometric model in **integer based increments** along said primary direction,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the element of “describing a movement having a primary direction thereof of a particle through said geometric model in integer based increments **along said primary direction**,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Coniglione et al., Tumer, and Moscovitch, individually or combined, do not teach or suggest all the claim limitations of claim 31. Therefore, the 35 U.S.C. § 103(a) rejection of claim 31 is not proper and Applicants respectfully request the rejection of claim 31 be withdrawn.

Regarding claim 32, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al.

reference does not teach or suggest “defining a material to be associated with **each said uniform volume element**,” as suggested by the Examiner.

Therefore, the prior art references of Silver, Kaufman et al., Coniglione et al., Tumer, and Moscovitch, individually or combined, do not teach or suggest all the claim limitations of claim 32. Therefore, the 35 U.S.C. § 103(a) rejection of claim 32 is not proper and Applicants respectfully request the rejection of claim 32 be withdrawn.

Regarding claims 33 and 34, these claims depend from claim 31, which is now allowable. As a result, claims 33 and 34 are now allowable and Applicants respectfully request that the rejection of claims 33 and 34 be withdrawn.

Regarding claim 35, as stated by the Examiner, this claim is a computer readable medium claim reciting the same limitations as those of claim 31. Consequently, the same arguments regarding claim 31 are applicable to claim 35. Because claim 31 is now allowable, claim 35 is also now allowable and Applicants respectfully request that the rejection of claim 35 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al. and further in view of U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer and U.S. Patent No. 6,212,540 to Nelson et al.

Claims 36 through 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541) and Nelson et al. (U.S. Patent No. 6,212,540). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 36, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the

element of “describing a particle track with a **primary direction** of movement through said geometric model,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest “defining a material to be associated with **each said uniform volume element**,” as suggested by the Examiner.

For these reasons, the prior art references of Silver, Kaufman et al., Coniglione et al., Tumer, and Nelson et al., individually or combined, do not teach or suggest all the claim limitations of claim 36. Therefore, the 35 U.S.C. § 103(a) rejection of claim 36 is not proper and Applicants respectfully request the rejection of claim 36 be withdrawn.

Regarding claims 37 and 38, these claims depend from claim 36, which is now allowable. As a result, claims 37 and 38 are now allowable and Applicants respectfully request that the rejection of claims 37 and 38 be withdrawn.

Regarding claim 39, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “stepping along said particle track in **integer based increments** of said coordinate system,” as suggested by the Examiner.

Therefore, the prior art references of Silver, Kaufman et al., Coniglione et al., Tumer, and Nelson et al., individually or combined, do not teach or suggest all the claim limitations of claim 39. Therefore, the 35 U.S.C. § 103(a) rejection of claim 39 is not proper and Applicants respectfully request the rejection of claim 39 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al., and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S.

Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer, U.S. Patent No. 5,498,876 to Moscovitch and U.S. Patent No. 6,212,540 to Nelson et al.

Claims 40 and 42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541), Moscovitch (U.S. Patent No. 5,498,876) and Nelson et al. (U.S. Patent 6,212,540). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 40, for the reasons stated in the argument above for claim 1 regarding “integer based increments,” Applicants assert that the Kaufman et al. reference does not teach or suggest the element of “simulating a particle movement along each said particle track through said geometric model in **integer based increments** along said primary direction of movement,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 13 regarding a “primary direction,” Applicants assert that the Tumer reference does not teach or suggest the element of “simulating a particle movement along each said particle track through said geometric model in integer based increments along said **primary direction** of movement,” as suggested by the Examiner.

Furthermore, for the reasons stated in the argument above for claim 3 regarding mapping material to uniform volume elements, Applicants assert that the Coniglione et al. reference does not teach or suggest “defining a material to be associated with **each said uniform volume element**,” as suggested by the Examiner.

Therefore, the prior art references of Silver, Kaufman et al., Fox et al., Coniglione et al., Tumer, Moscovitch, and Nelson, individually or combined, do not teach or suggest all the claim limitations of claim 40. Therefore, the 35 U.S.C. § 103(a) rejection of claim 40 is not proper and Applicants respectfully request the rejection of claim 40 be withdrawn.

Regarding claim 42, this claim depends from claim 40, which is now allowable. As a result, claim 42 is now allowable and Applicants respectfully request that the rejection of claim 42 be withdrawn.

Obviousness Rejection Based on U.S. Patent No. 6,078,681 to Silver in view of U.S. Patent No. 5,101,475 to Kaufman et al., and further in view of U.S. Patent No. 6,083,167 to Fox et al., U.S. Patent No. 6,589,502 to Coniglione et al., U.S. Patent No. 5,821,541 to Tumer, U.S. Patent No. 5,498,876 to Moscovitch, U.S. Patent No. 6,212,540 to Nelson et al. and U.S. Patent 5,493,595 to Schoolman

Claim 41 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Silver (U.S. Patent No. 6,078,681) in view of Kaufman et al. (U.S. Patent No. 5,101,475), and further in view of Fox et al. (U.S. Patent No. 6,083,167), Coniglione et al. (U.S. Patent No. 6,589,502), Tumer (U.S. Patent No. 5,821,541), Moscovitch (U.S. Patent No. 5,498,876), Nelson et al. (U.S. Patent 6,212,540) and Schoolman (U.S. Patent 5,493,595). Applicants respectfully traverse this rejection, as hereinafter set forth.

Regarding claim 41, this claim depends from claim 40, which is now allowable. As a result, claim 41 is now allowable and Applicants respectfully request that the rejection of claim 41 be withdrawn.

Objections to Claims 11, 12 and 24/Allowable Subject Matter

Applicants note with appreciation that claims 11, 12 and 24 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form.

However, because applicants believe the independent claims from which these claims depend are now allowable, applicants have not placed these claims in appropriate independent form at this time.

Claims Not Addressed in the Office Action

Applicants note that claim 43 was discussed only as a 35 U.S.C. §101 non-statutory subject matter rejection. Applicants amended claim 43 as suggested by the Examiner to recite statutory subject matter. However, there were no other reasons given for rejecting claim 43 and no indication given that claim 43 includes patentable subject matter. Therefore, Applicants respectfully request that the Examiner inform Applicants' undersigned attorney of the appropriate disposition of claim 43 if an additional rejection was, in fact, intended. In the absence of any such communication, Applicants presume that claim 43 is allowable.

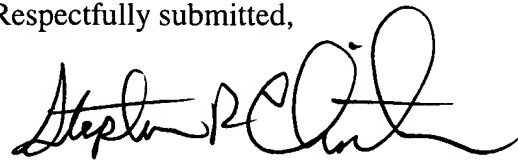
ENTRY OF AMENDMENTS

The amendments to claims 1-43 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application.

CONCLUSION

Claims 1-43 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

Respectfully submitted,



Stephen R. Christian
Registration No. 32,687
Attorney for Applicants
P.O. Box 1625
Idaho Falls, ID 83415-3899
Phone: (208) 526-9140
Fax: (208) 526-8339

Date: 22 OCT 2004
SRC/djp